Amendments to the Specification

Replace the paragraph beginning on page 6, line 23 with the following paragraph:

-- According to one aspect of the present invention, there is provided an array receiver for processing signals received from a plurality (M+1) of co-channel transmitting users via an array antenna having an array of (N) antenna elements to obtain a set of user-specific estimated received signals (z_0,..., z_M) each corresponding to a respective one of said transmitting users, said array receiver having:

radio frequency units (26/1,..., 26/N) for conversion of signals from the array antenna to provide a corresponding set of (N) antenna element signals (x_1, x_2,..., x_N), respectively, where N is at least equal to the number (M+1) of transmitting users, each of the antenna element signals (x_1, x_2,..., x_N) comprising information from each of the plurality (M+1) of transmitting users,

a common preprocessing section (40) for receiving and processing the (N) antenna element signals (x_1, x_2, ..., x_N) from the radio frequency units (26/1 ... 26/M) to provide a plurality (M+1) of basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$), and

a plurality (M+1) of signal processing units (60_0,..., 60_M) each for processing said basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$) to provide a respective one of said user-specific estimated received signals (z_0,..., z_M),

wherein the common preprocessing section (40) comprises

filtering means (40/1, ..., 40/M) for sampling each of the (N) antenna element signals (x_1, x_2,..., x_N) and combining resulting samples of at least some of said antenna element signals (x_1, x_2,..., x_N) to provide said plurality of (M+1) basis signals ($\boldsymbol{y}_0$..., $\boldsymbol{y}_M$), each of the basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) comprising a different combination of the antenna element signals (x_1, x_2,..., x_N) and having μ dimensions spanning a dominant subspace containing most of the energy from a respective one of the transmitted user signals, said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) together having fewer space-time dimensions (μx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna element signals (x_1, x_2,..., x_N), where L is the maximum length of the channel impulse response in symbol periods,

and

updating means for periodically updating parameters of the filtering means (40/1, ..., 40/M) used for deriving each particular basis signal such that each of the user-specific estimated received signals ($z_0, z_1, \ldots z_M$) will exhibit a desired optimized concentration of energy;

and wherein each of said signal processing units ($60_0, \ldots, 60_M$) has

a plurality of inputs coupled to the common preprocessing section (40) for receiving therefrom all of the (M+1) basis signals ($\boldsymbol{y}_0, \ldots, \boldsymbol{y}_M$), and is

adapted for processing and combining at least some of said (M+1) basis signals ($\boldsymbol{y}_0, \ldots, \boldsymbol{y}_M$) to produce a respective one of said set of user-specific estimated received signals ($z_0, \ldots, z_M$) for a corresponding desired one of the plurality (M+1) of transmitting users. --

Replace the paragraph beginning on page 8, line 13 with the following paragraph:

-- According to a second aspect of the present invention, there is provided an array receiver system comprising an array antenna having a plurality (N) of antenna elements in combination with an array receiver for processing signals received from a plurality (M+1) of co-channel transmitting users via said array antenna to obtain a set of user-specific estimated received signals ($z_0, \ldots, z_M$) each corresponding to a respective one of said transmitting users, wherein said array receiver has:

radio frequency units (26/1,..., 26/N) for conversion of signals from the array antenna to provide a corresponding set of (N) antenna element signals ($x_1, x_2, \ldots, x_N$), respectively, where N is at least equal to the number (M+1) of transmitting users, each of the antenna element signals ($x_1, x_2, \ldots, x_N$) comprising information from each of the plurality (M+1) of transmitting users,

a common preprocessing section (40) for receiving and processing the (N) antenna element signals ($x_1, x_2, \ldots, x_N$) from the radio frequency units (26/1 ... 26/M) to provide a plurality (M+1) of basis signals ($\boldsymbol{y}_0, \ldots, \boldsymbol{y}_M$), and

a plurality (M+1) of signal processing units ($60_0, \ldots, 60_M$) each for processing said basis signals ($\boldsymbol{y}_0, \ldots, \boldsymbol{y}_M$) to provide a respective one of said user-specific estimated received signals ($z_0, \ldots, z_M$),

wherein the common preprocessing section (40) comprises

filtering means (40/1, ..., 40/M) for sampling each of the (N) antenna element signals (x_1, x_2,..., x_N) and combining resulting samples of at least some of said antenna element signals (x_1, x_2,..., x_N) to provide said plurality of (M+1) basis signals ($\boldsymbol{y}_0$..., $\boldsymbol{y}_M$), each of the basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) comprising a different combination of the antenna element signals (x_1, x_2,..., x_N) and having μ dimensions spanning a dominant subspace containing most of the energy from a respective one of the transmitted user signals, said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) together having fewer space-time dimensions (μx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna element signals (x_1, x_2,..., x_N), where L is the length of the channel impulse response in symbol periods,

and

updating means for periodically updating parameters of the filtering means (40/1, ..., 40/M) used for deriving each particular basis signal such that each of the user-specific estimated received signals (z_0, z_1,... z_M) will exhibit a desired optimized concentration of energy;

and wherein each of said signal processing units (60_0,..., 60_M) has

a plurality of inputs coupled to the common preprocessing section (40) for receiving therefrom all of the (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$), and is

adapted for processing and combining at least some of said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) to produce a respective one of said set of user-specific estimated received signals (z_0,..., z_M) for a corresponding desired one of the plurality (M+1) of transmitting users. --

Replace the paragraph beginning on page 10, line 4 with the following paragraph:

-- Thus, according to a third aspect of the present invention, there is provided a method of receiving signals from a plurality (M+1) of co-channel transmitting users via an array antenna having an array of (N) antenna elements providing a set of antenna element signals (x_1, x_2,..., x_N), respectively, to obtain a set of user-specific estimated received signals (z_0,..., z_M) each corresponding to a respective one of said transmitting users, the method comprising the steps of:

using radio frequency units (26/1,..., 26/N), converting signals from the array antenna to provide a corresponding set of (N) antenna element signals (x_1, x_2,..., x_N),

respectively, where N is at least equal to the number (M+1) of transmitting users, each of the antenna element signals (x_1, x_2,..., x_N) comprising information from each of the plurality (M+1) of transmitting users,

using a common preprocessing section (40), receiving and processing the (N) antenna element signals (x_1, x_2, ..., x_N) from the radio frequency units (26/1 ... 26/M) to provide a plurality (M+1) of basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$), and

using a plurality (M+1) of signal processing units (60_0,..., 60_M), processing said basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$) to provide said user-specific estimated received signals (z_0,..., z_M),

wherein the receiving and processing step comprises the steps of

using filtering means (40/0,..., 40/M), sampling each of the (N) antenna element signals (x_1, x_2,..., x_N) and combining resulting samples of at least some of said antenna element signals (x_1, x_2,..., x_N) to provide said plurality of (M+1) basis signals ($\boldsymbol{y}_0$..., $\boldsymbol{y}_M$), each of the basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) comprising a different combination of the antenna element signals (x_1, x_2,..., x_N) and having μ dimensions spanning a dominant subspace containing most of the energy from a respective one of the transmitted user signals, said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) together having fewer space-time dimensions (μx(M+1)) than the space-time dimensions (NxL) of the (N) combined antenna element signals (x_1, x_2,..., x_N), where L is the length of the channel impulse response in symbol periods,

and

periodically updating parameters of the filtering means (40/0, ..., 40/M) used for deriving each particular basis signal such that each of the user-specific estimated received signals (z_0, z_1,... z_M) will exhibit a desired optimized concentration of energy;

and wherein the step of processing the basis signals ($\boldsymbol{y}_0$, ..., $\boldsymbol{y}_M$) comprises the steps of

receiving from the common preprocessing section (40) all of the (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$), and

processing and combining at least some of said (M+1) basis signals ($\boldsymbol{y}_0$,..., $\boldsymbol{y}_M$) to produce each of said set of user-specific estimated received signals (z_0,..., z_M) for a corresponding desired one of the plurality (M+1) of transmitting users. --

Replace the paragraph beginning at page 11, line 21 with the following amended paragraph:

-- Embodiments of any of the three aspects of the invention may include space-time matched filtering. This provides a much greater potential complexity reduction and makes the invention more widely applicable. Thus, to further decrease computational cost, a logical extrapolation of the above concept is to extend the eigenfiltering to the temporal - as well as the spatial - domain. In this case, only M+1 taps are left to be actively adapted (at every packet) for each user (as opposed to NL taps for a conventional system where N is the number of elements and L is the required adaptive filter length, <u>i.e., the maximum number of symbol periods or filter taps.</u> To achieve acceptable performance, it is normally required that $M \geq N$; therefore this system will reduce the number of actively adapted taps by at least a factor of L.) --

Amend the paragraph beginning at page 15, line 9 as follows:

-- Although the performance analysis will be presented in the frequency domain, the actual implementation can be made in the time domain. The eigenfilters then take the form of banks of N tapped-delay lines $50/m_1$, ...$50/m_N$ each with a series of one-symbol delays, the number <u>L</u> of such delays being chosen to give a delay line length according to the typical memory length of channels in the band of operation. In each tapped delay line, a series of multipliers extract the delayed signals from respective taps of the delay line and multiply each of them by a respective complex weight. For example, in delay line $50m_1$, having individual delays $52m_{11}$,... $52m_{1L}$, a series of multipliers $54m_{11}$,... $54m_{1L}$ multiply the tapped signals by complex weights w_{11}, ..., w_{1L}, respectively, while, in delay line $50m_N$ having individual delays $52m_{N1}$,... $52m_{NL}$, a series of multipliers $54m_{N1}$,... 54_{NL} multiply the tapped signals by complex weights w_{N1}, ... w_{NL}, respectively. The other tapped delay lines are similar. --

Amend the paragraph beginning at page 15, line 20 as follows:

-- The outputs of the delay lines $50/m_1$,..., $50/m_N$, i.e., the signals from the multipliers $54m_{1L}$,..., 54_{NL}, respectively, are combined by a summer 52/m to form $y_{m,1}$, the primary eigenfilter output for user m. It should be noted that there can be any number of such eigenfilters whose combined outputs will make up the dominant subspace filter output i.e. subspace signal $\boldsymbol{y}_m$. Thus, $\boldsymbol{y}_m = [y_{m,1} \ldots y_{m,\mu}]$ where μ is the number of eigenfilters defining the dimensions of the

dominant subspace for user *m*. This estimate $\boldsymbol{y}_m$ is supplied to all of the signal processors 60/0,..., 60/M (Figure 1). --